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Dubai Design Week 2016
3rd in the UK for Research in Art, Design and Architecture
REF 2014
The Belfast School of Architecture in numbers:

- 350
- 23
- 4
- 3
- 2
The Belfast School of Architecture in numbers:

350 Students
23 Staff
4 Degrees
3 Schools in total within the Faculty of ADBE
2nd Smallest School in the University
What our students do

Working with Industry
Leckey design, develop and sell a wide range of mobility, seating, standing and therapeutic products worldwide mainly through distributors, to hospitals and hospices, therapists and charities.
Cerebral palsy is the most common physical disability in childhood.

The current UK incidence rate is 1 in 400 births.

Approximately 1,800 children in the UK are diagnosed with cerebral palsy every year.

- 10,000 in the USA
- 13,000 in the EMEA
- One in four children with cerebral palsy has a severe learning disability

For every 100 girls with cerebral palsy, there are 135 boys with cerebral palsy.
After thorough research on the disability Cerebral Palsy and existing products, I started the ideation process by looking at a wide range of modes of movement. This ranged from sitting to standing, to leg propelled and arm propelled trikes and bikes. Each idea however had to include back support to hold the child securely. I had two concepts which I took to a presentation with the company, the Zoomom was duel use trike that could be pedaled and then the steering would drop and the child could push using their arms. The Double trike could be pedaled by using your feet or by your arms. Leckey were impressed by the dual idea in each. However, the Zoomom would be too big for indoor use and the double trike may not be able to be used by the children I was designing for. Leckey loved the safety harness used within the double trike as it gave excellent support under the arms and around the back. I also learnt that my ideas need to include pelvic support as this is vital.
After the presentation with Leckey, I had a visit with a clinical therapist who was able to tell me the struggle a person has with cerebral palsy. This aided me greatly in being able to design for the user. This is why I began to look at the user directly and design for their needs, and the main need for the child is support. This began at the chair and looking towards bicycle seats as they allow people to sit and stand, then looking to horse saddles as they give more support and finally the addition of the back rest and support harness.

Once the seat was decided I then designed the trike around that. The seat being able to be raised and lowered by 25cm to adjust for children between the ages of 3-5s. After, I went further into development by looking at various shapes and forms for the key aspects of the bike, i.e. the handles, main frame, and the push handle at the back.
After the final design was decided I moved into CAD. I wanted to highlight key features of the design; the easily adjustable height for ages 3-5. The quick release safety harness that allows a child to be released easily in case they lose a secure. And also the extendable handle for the parents and siblings as family interaction is very important to the Firefly range at Leckey.

I added silhouettes to portray the correct height and scale of the trike with children and adults. This gives a clear indication of the intended height. I also thought about the trike as a range, that they could have multiply variations and not just the one colour.

**Easy Adjustable Heights**

**Quick Release Safety Harness**

**Extendable Handle for Parent**
Lucy Mulholland - Placement at Leckey. Red Dot Award
Rothko believed that the rectangles merely offered a new way of representing the presences or spirits.

Mark Rothko: Four Darks in Red (1958)
**Insights & Research**

**Life Event**
We all encounter many psychological and physiological stressors throughout our lifetime. These events vary in nature but can potentially lead to problems in later life.

**Process**
How we deal with these life events will determine how badly it affects us.

Our subconscious mind is very good at repressing these memories with unresolved negative emotions still attached.

**Cortisol**
Cortisol is the stress hormone and helps the body prepare to react.

This shows the importance of resolving those negative emotions before our subconscious represses the memories further.

**White Blood Cells**
The reason a psychological stressor can affect us physically is because cortisol inhibits the action of our white blood cells.

This shows an extreme example of the affects stress has on our bodies.

**Health Problems**
Stress-induced cardiomyopathy is the technical term for dying of a broken heart (syndrome). This shows an extreme example of the affects stress has on our bodies.

In a general point of view, stress and unresolved negative emotions can take you on a downward spiral if not confronted.

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**Mental Health effects**

1 in 4 people at some point in their lives.

Half of these cases start by the age of 14.

32.3% of 15-25 year olds have 1 or more psychiatric conditions.

500% increase in the issuing of anti depressants between 1992 & 2011.

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**Physiological & Psychological Effects**

Not only do stressful and difficult events affect us psychologically, they affect us physically too.

Our failure to confront and resolve negative emotions can lead to long-term health effects, and the longer the emotions are left unresolved the harder it becomes to solve and the more damage we are doing to ourselves.

Our subconscious mind will continue to repress the memories that are causing the emotions but those memories will always remain as triggers if we encounter a similar event in the future.

Once we do encounter a similar event, our body will be experiencing the same stress response as shown above but we may not be aware that this is happening.

This is quite often the cause of emotional state trumping reason.
Colour usage and surface coverage is physical data that the Magic products record.

Input descriptors are words that alter the appearance of the 3D model.

Adjust the appearance of basic descriptors to alter the appearance of the 3D model.
Interpretation

Nervous / Stressed
- Angular
- Top-heavy profile
- Leaning forwards

This form would be an example of a user experiencing a high heart rate and galvanic response, while applying a high amount of pressure and expressing negative feeling words.

Depressed / Lethargic
- Smooth, sagging curvatures
- Rounded profile
- Leaning heavily forwards

This form would be an example of a user experiencing a low heart rate and galvanic response, while applying a minimal amount of pressure and expressing negative feeling words.

Elated / Excited
- Sharp curvatures
- Top-heavy profile
- Leaning backwards

This form would be an example of a user experiencing a high heart rate and galvanic response, while applying a high amount of pressure and expressing positive feeling words.

Serene / Relaxed
- Smooth, balanced curvatures
- Rounded profile
- Straight

This form would be an example of a user experiencing a low heart rate and galvanic response, while applying a minimal amount of pressure and expressing positive feeling words.

Characteristics

The data collected from the conscious and subconscious responses we are experiencing, while using the Magic Pen, are entered into an algorithm to produce these abstract 3D forms.

The characteristics that are seen within these forms are inspired by facial expressions and body posture without becoming literal representations. Therefore, the gift of these abstract forms is that we will infill its apparent emptiness with meaning and in this act, we face ourselves.

Asking why we feel the way we do, while interpreting these forms, is used much like an affect bridge taking us back to the root cause of the issue. This will enable us to understand why we are experiencing such emotions and displaying such behaviours.
Walkthrough

1. Expression

The user will be encouraged to write or draw about an experience or person that has influenced their life to enable the pen to read their physical responses to the subject matter.

2. Interpretation

The data collected from the pen is collated and entered into an algorithm. A form, representing your physical response, is generated and 3D printed. The user is now encouraged to interpret this form in an attempt to understand their emotional response to the subject matter.

3. Affirmation

Once the repressed memories and associated emotions have been unearthed and understood, the case will emit soothing lights and sounds while you interact with the pen to counteract a negative state.

Magic Pen
What our students do

Working in Industry- Not just Healthcare Products
What I do
Furniture

Materials Handling
What is **MEDUCATE**

An interactive learning tool that will allow sufferers to better understand their body, the condition they are suffering from, the treatment they are about to and are currently under going.

It will deliver information to them in several different forms from 3D computer generated models, Video/4D clips, interactive diagrams and text based forms.

The technology is designed to be available to the user (patient) at all times and delivered in a mode that is bespoke to their learning needs.
What is **MEDUCATE**

It is underpinned by documented research that every Learner can be categorised by how they take in information and how they transmit it:

**VARK**

- **Visual**- Interactive Diagrams, different formats, graphs, charts and plans.
- **Aural**- Audio, Discussion, verbal delivery.
- **Read/Write**- lists, notes and text in all its formats and whether in print or online.
- **Kinesthetic**- examples, case studies.

Every Patient of the Health Service cannot gain a full understanding of their condition through existing methods.
Who are the MEDUCATE Team?

Martin McGinn, Lecturer in Design, Ulster University.
15 years experience in Designing products in several sectors, including, Medical, Materials Handling, Furniture, Renewable Energy, White Goods, Web and Interface design. Lecturing in Design for 12 years.

Dr Aidan Cole, Clinical Oncologist, MB BCh BAO MRCP PhD, Employed by NI Cancer Centre/Belfast Trust.
Chapter 3

Where is the Prostate?

This gland is a small organ located only in men. It is
about the size of a walnut and sits just behind
the bladder. It surrounds the first part of the ureter;
the tubes that carry urine from the kidneys to the
bladder.
Benefits:

To the Patient:
- Cuts out misinformation for the patient
- Better Education and awareness of their condition
- Aids with Patient consent process
- Bespoke delivery of the information
- More accessible information for them and their family
- More inclusive in the treatment process
- Will support for long treatment processes
- Will help with Survivorship
- Better quality of Life
Benefits:

To the Medical Staff:

- Will aid/alleviate pressure on the service provision
- Saving time in answering questions about information taken from another non-NHS source.
- Will support for long treatment processes
Benefits:

To the NHS:

- Cost saving
- Time saving
- Better Patient Care
How we decide the best course of treatment?